National NV-730 VCR

Playback Audio Failure — Troubleshooting & Repair Case Study

Fault: Playback audio worked briefly after a long shutdown, then gradually disappeared.

Final Cause: C4019 — 22 µF electrolytic capacitor

Location: Audio section

1. Original Symptoms

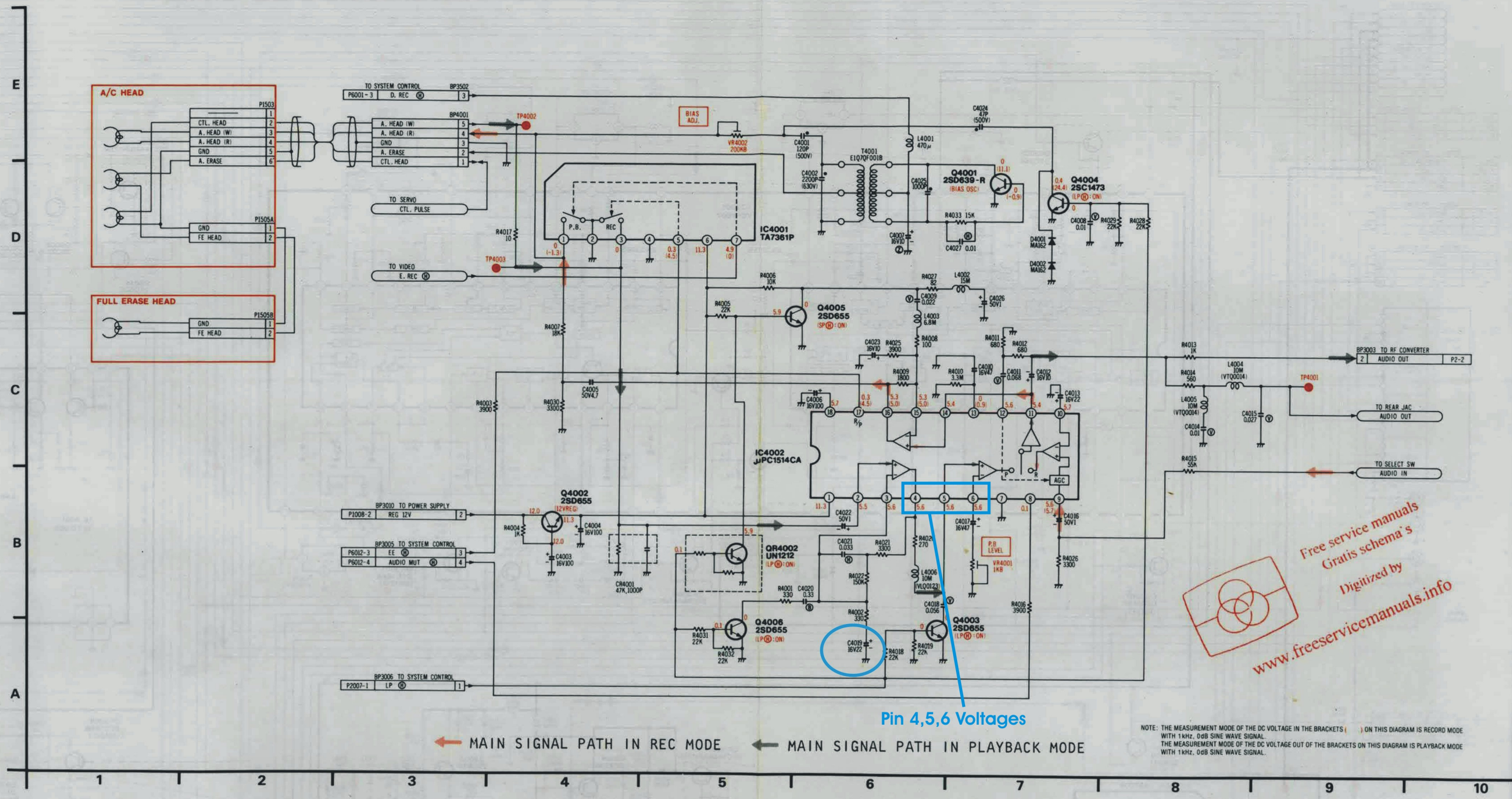
- After being switched off for several days, **playback audio initially worked**.
- Audio lasted only briefly, then **gradually became weaker and disappeared**.
- When PLAY was started, a single **“dupp” sound** occurred on tape playback start.
- The **“dupp” sound occurred only once**, rather than continuously.
- Video playback remained normal.

2. µPC1514CA Voltage Investigation

- During tape playback, **µPC1514CA pins 4, 5, 6, 11 and 14** were monitored.
- When playback audio was present, these pins measured approximately **5–5.6 V**.
- During operation, the voltages slowly increased toward **approximately 10 V**.
- As the voltages increased, **playback audio gradually diminished and disappeared**.

5/29/16

3-17. AUDIO SCHEMATIC DIAGRAM



NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKETS ( ) ON THIS DIAGRAM IS RECORD MODE WITH 1kHz, 0dB SINE WAVE SIGNAL.
THE MEASUREMENT MODE OF THE DC VOLTAGE OUT OF THE BRACKETS ON THIS DIAGRAM IS PLAYBACK MODE WITH 1kHz, 0dB SINE WAVE SIGNAL.

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AUDIO SCHEMATIC	
Transistor	
Q4001	D-7
Q4002	B-4
Q4003	A-7
Q4004	D-7
Q4005	D-6
Q4006	A-5
Transistor & Resistor	
QR4002	B-5

Integrated Circuit	
IC4001	D-5
IC4002	C-5
Test Point	
TP4001	C-9
TP4002	E-4
TP4003	D-4
Adjustment	
VR4001	B-7
VR4002	E-5

Connector	
BP3003	C-9
BP3005	B-3
BP3006	A-3
BP3010	B-3
BP3502	E-3
BP4001	E-3
P1503	E-2
P1505A	D-2
P1505N	C-2

ADDRESS INFORMATION

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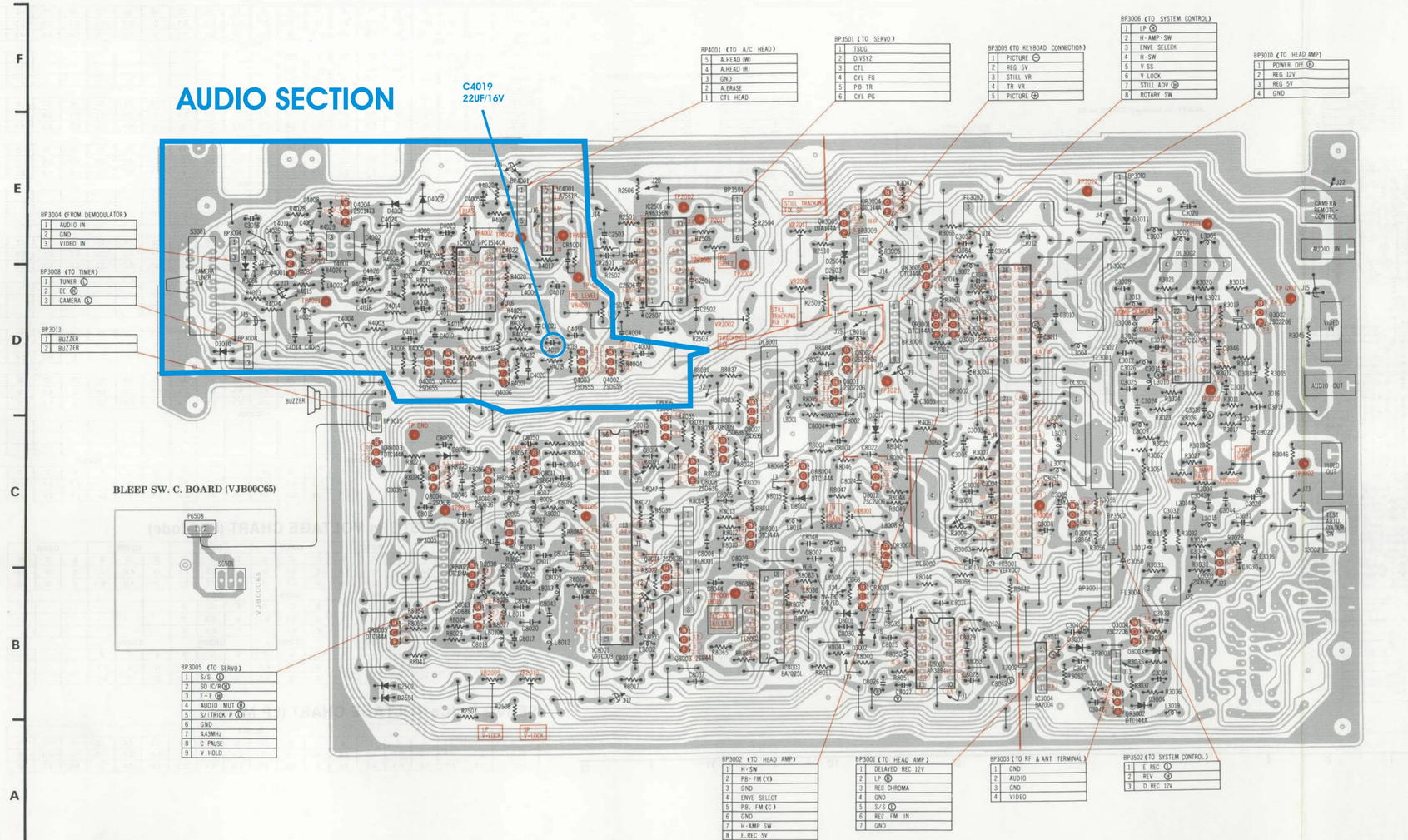
3-13. LUMINANCE & CHROMINANCE Section In Main Circuit Board (VEP03214A/B)



LUMINANCE ICs VOLTAGE CHART (LP Mode)

REF. NO.	IC3001																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
PLAY	0.4	2.4	2.1	0.4	2.8	2.1	3.2	1.4	0	2.2	2.5	3.2	0	0	—	0	0	0	2.7	0
REC	0.4	2.4	2.2	0.4	2.8	2.2	3.2	1.4	0	0	0	0.1	0	0	—	0	0	0	4.5	0
REF. NO.	IC3001																			
MODE	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
PLAY	0.1	—	—	—	—	5.0	0.7	1.4	2.7	2.5	1.3	2.4	0	3.4	0	3.6	0	1.1	1.6	0
REC	0	—	—	—	—	5.1	0.7	1.4	0	0	0	0	0	0.3	0	0	0	0	0	0
REF. NO.	IC3001																			
MODE	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
PLAY	1.1	1.6	1.8	0	0	0	4.8	3.1	—	4.8	0	—	—	—	—	1.8	0	0	2.5	4.1
REC	0	0	0	0	0	0	0	0	—	0	0	—	—	—	—	0	0	0	2.6	4.1
REF. NO.	IC3001																			
MODE	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76				
PLAY	1.4	4.1	0	—	0	0	5.0	2.1	2.1	—	2.0	2.0	2.7	2.6	0	2.6				
REC	1.4	4.0	0	—	0	0	5.1	2.1	2.1	—	2.0	2.0	2.7	2.6	0	2.3				
REF. NO.	IC3002																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
PLAY	5.0	5.0	2.9	0	4.3	4.1	2.9	0.2	2.5	3.0	1.7	0.6	3.0	2.3	3.0	2.2	1.4	4.0	4.0	0.5
REC	5.0	5.0	2.9	0	4.3	4.1	2.9	0.2	2.5	3.0	1.7	0.6	3.0	2.3	3.0	2.2	1.4	4.0	4.0	0.5
REF. NO.	IC3002																			
MODE	21	22																		
PLAY	2.9	2.9																		
REC	2.9	2.9																		
REF. NO.	IC3003																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12								
PLAY	0	0	0	0	0	0	4.8	0.3	0	0	0	0								
REC	0	0	0	0	0	0	4.8	5.0	0	0	0	0								
REF. NO.	IC3004																			
MODE	1	2	3	4	5															
PLAY	0.3	0	0	0	0															
REC	0.3	0	0	0	0															

CHROMINANCE ICs VOLTAGE CHART (LP Mode)

REF. NO.	IC8001																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
PLAY	5.0	0.7	0.4	5.0	2.6	0	—	—	—	—	—	—	2.6	3.2	1.1	0.8	2.6	2.0	1.9	0
REC	5.0	0.7	0.4	5.0	2.6	0	—	—	—	—	—	—	2.6	3.2	1.1	0.9	2.8	2.1	2.4	0
REF. NO.	IC8001																			
MODE	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
PLAY	2.6	3.5	0	1.4	0	0	0	0	0	3.0	3.0	1.7	0	0	0	0	3.2	2.9	3.3	5.0
REC	2.6	3.6	0	0	0	0	0	0	0	3.5	3.5	1.7	6.2	0	0	0	3.2	2.9	3.0	5.0
REF. NO.	IC8001																			
MODE	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56				
PLAY	4.0	1.9	4.1	0	—	—	—	—	—	4.3	4.9	0	0.4	0.6	4.8					
REC	4.0	2.0	4.1	0	—	—	—	—	—	4.3	0	0	0.4	0.6	4.8					
REF. NO.	IC8002																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
PLAY	0	1.9	3.3	5.1	0	1.4	0	3.4	3.2	2.6	0	0.5	5.0	3.3	1.1	4.3	0	2.6	4.1	3.3
REC	0	1.9	3.3	5.1	0	1.4	0	3.4	3.2	2.6	0	0.5	5.0	3.3	1.1	4.3	0	2.6	3.7	3.3
REF. NO.	IC8003																			
MODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
PLAY	3.7	0	0	3.7	4.2	0	4.5	0	3.1	0	3.6	0	3.6	0	0	0.7	5.1	5.1		
REC	3.7	1.2	0	3.7	4.3	0	4.6	0	3.1	0	3.6	0	3.6	0	0	0.7	5.1	5.1		

CHROMINANCE TRANSISTORs VOLTAGE CHART (LP Mode)

REF. NO.	Q8001			Q8002			Q8003			Q8004			Q8005			Q8006		
MODE	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
PLAY	1.4	4.9	0.5	1.4	4.9	2.2	0	0	0.9	2.6	2.5	0.3	2.3	5.0	2.9	5.1	0.6	5.1
REC	0	0	0.5	0	0	0	1.5	0	0.9	2.6	2.5	0.5	2.3	5.0	2.9	5.1	0.6	5.1
REF. NO.	Q8007			Q8008			Q8009			Q8010			Q8011			Q8012		
MODE	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
PLAY	0	5.0	0	0	0	0	0	0	0.6	0.5	5.0	0.4	5.0	4.8	4.3	1.5	3.4	2.2
REC	0	5.1	0	0	0	0	0	0	0.6	0.5	5.1	0.4	5.1	4.8	4.4	1.5	3.4	2.2
REF. NO.	Q8013			Q8014														
MODE	E	C	B	E	C	B												
PLAY	2.1	3.2	2.7	0	2.6	0												
REC	0	0	0	0	2.6	0												
REF. NO.	QR8001			QR8002			QR8003			QR8004			QR8005					
MODE	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B			
PLAY	0	2.6	0.3	0	0.3	0.7	0	0	5.1	0	0.6	0.3	0	0	5.0			
REC	0	2.6	0.3	0	0.2	0.7	0	0	5.1	0	0.6	0.3	0	0.1	5.1			

LUMINANCE TRANSISTORs VOLTAGE CHART (LP Mode)

REF. NO.	Q3001			Q3002			Q3003			Q3004			Q3005			Q3006		
MODE	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
PLAY	0	0.4	0	2.4	5.0	2.6	4.7	11.9	5.4	0.7	5.1	1.4	—	0	0	5.1	4.9	4.2
REC	0	0.4	0	2.4	5.0	2.6	4.7	11.9	5.4	0.7	5.1	1.4	—	0	0	5.1	0	5.0
REF. NO.	QR3001			QR3002			QR3003			QR3004			QR3005			QR3006		
MODE	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B	E	C	B
PLAY	0	0	5.0	0	3.2	0.1	0	0	0	0	0.1	4.1	5.1	5.0	0.1	0	0	5.0
REC	0	0	5.0	0	3.2	0	0	0	0	0	0.1	4.1	5.1	5.0	0.1	0	0	5.0
REF. NO.	QR3007																	
MODE	E	C	B															
PLAY	0	1.6	0.4															
REC	0	1.8	0.4															

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3. µPC1514CA Replacement Test

- The **µPC1514CA was suspected and replaced/tested**.
- The same voltage-rise and audio-loss behaviour remained.
- **Replacing/testing** the µPC1514CA did not resolve the voltage-rise or audio-loss problem, indicating that the fault was elsewhere in the surrounding circuitry

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4. Final Fault & Repair

- Further investigation identified **C4019 — 22 µF electrolytic capacitor** in the audio section.
- **C4019 was replaced.**
- The abnormal voltage-rise behaviour was resolved and **normal playback audio was** restored
- The **"dupp" symptom was also resolved**.

5. Final Diagnosis

C4019 (22 µF electrolytic capacitor) was the faulty component causing the National NV-730 playback audio failure.

6. Diagnostic Lesson

- **An abnormal IC voltage does not necessarily mean the IC itself is faulty.**
- When several IC pins change together, monitor the voltages **while the fault develops** and investigate the surrounding circuitry.
- The key pattern was: **~5–5.6 V → ~10 V → audio fades → audio disappears**.
- The µPC1514CA was not the problem; **C4019 was**.